

Name: Solutions

Simplify each expression (do not leave any negative exponents):

1.  $\sqrt{9} = 3$

2.  $\sqrt{16} = 4$

3.  $\sqrt[3]{27} = 3$

4.  $\sqrt[3]{64} = 4$

5.  $\sqrt[4]{16} = 2$

6.  $\sqrt[4]{81} = 3$

7.  $9^{\frac{3}{2}} = \left(9^{\frac{1}{2}}\right)^3$   
 $= 3^3$   
 $= 27$

8.  $8^{\frac{2}{3}} = \left(8^{\frac{1}{3}}\right)^2$   
 $= 2^2$   
 $= 4$

9.  $27^{\frac{4}{3}} = \left(27^{\frac{1}{3}}\right)^4$   
 $= 3^4$   
 $= 81$

10.  $4^{\frac{5}{2}} = \left(4^{\frac{1}{2}}\right)^5$   
 $= 2^5$   
 $= 32$

11.  $81^{\frac{3}{4}} = \left(81^{\frac{1}{4}}\right)^3$   
 $= 3^3$   
 $= 27$

12.  $1000^{\frac{3}{4}} = \left(1000^{\frac{1}{4}}\right)^3$   
 $= 10^3$   
 $= 1000$

13.  $\frac{6^9}{6^6} = 6^3 = 216$

14.  $\frac{5^{14}}{5^{11}} = 5^{14-11}$   
 $= 5^3$   
 $= 125$

15.  $\frac{7^5}{7^7} = \frac{1}{7^2} = \frac{1}{49}$

16.  $\frac{x^{14}}{x^6} = x^8$

17.  $\frac{y^{11}}{y^{15}} = \frac{1}{y^4}$

18.  $\frac{x^{10}y}{x^6y^3} = \frac{x^4}{y^2}$

$$19. \frac{35x^8}{7x^3} = 5x^5$$

$$20. \frac{5x^7y}{40x^6y^3} = \frac{x}{8y^2}$$

$$21. \frac{42x^2y^5}{14x^5y^9} = \frac{3}{x^3y^4}$$

$$22. x \cdot x^{\frac{1}{3}} = x^{1+\frac{1}{3}} = x^{\frac{4}{3}}$$

$$23. \frac{x}{x^{-1}} = x \cdot x = x^2$$

$$24. \frac{x^{-3}}{x^{-1}} = x^{-3-(-1)} = x^{-3+1} = x^{-2} = \frac{1}{x^2}$$

$$25. (2x^2y^3)^3 = 8x^6y^9$$

$$26. 5x^3 + 9x^3 = 14x^3$$

$$27. 2x^2y^4 + 8x^2y^4 = 10x^2y^4$$

$$28. (2x^2y^3)^4 + (3x^4y^6)^2 = 16x^8y^{12} + 9x^8y^{12} = 25x^8y^{12}$$

$$29. \frac{(x+y)^3}{(x+y)} = (x+y)^2 = x^2 + 2xy + y^2$$

$$30. \left(6x^{\frac{1}{2}}\right)\left(3x^{\frac{1}{3}}\right) = 18x^{\frac{1}{2}+\frac{1}{3}} = 18x^{\frac{5}{6}}$$

$$31. \left(\frac{4n^5}{m}\right)^3 = \frac{4^3n^{15}}{m^3} = \frac{64n^{15}}{m^3}$$

$$32. \left(\frac{3m^2n^7}{m}\right)^0 = 1$$

$$33. \frac{x^{-5}}{x^{-2}} = x^{-5-(-2)} = x^{-5+2} = x^{-3} = \frac{1}{x^3}$$